The Vetronics Institute

a Collaborative Research Initiative
Sponsored by the

U.S. Army Vetronics Technology Center

2001 Vehicle Technologies Symposium: Intelligent Systems for the Objective Fleet
29-31 May 2001
Paul Richardson, University of Michigan-Dearborn

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Abstract

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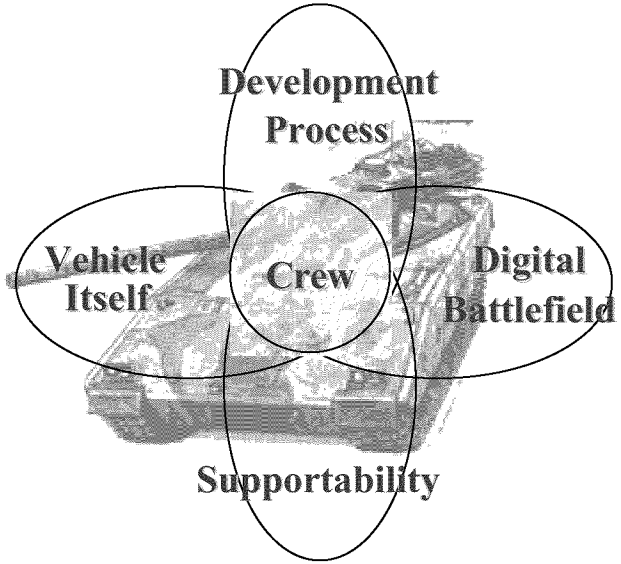
Introduction

The ***Vetronics Concept*: The <u>discipline</u>** for **<u>total</u>** electrical/electronics **<u>system</u>** integration.



The ***Vetronics Institute*** (VI) was Established in May 2000

- As an initiative of the **U.S. Army Vetronics Technology Center** (VTC) to support organizational research activities
- The Goal of the VI is to provide a mechanism to coordinate relevant research activities between the VTC and Universities in Southeastern Michigan.

Objectives

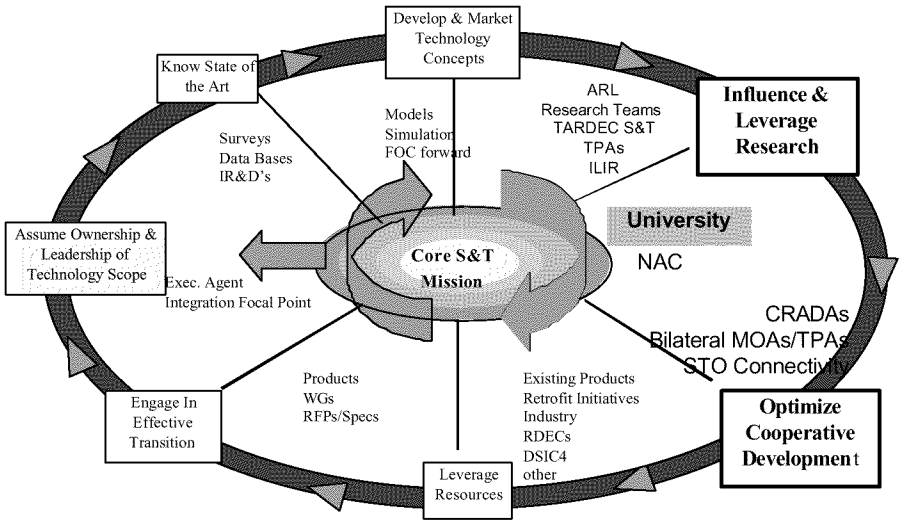
The ***Objectives*** of the **VI** are to:

(i) acquire and disperse knowledge of relevant research in Vetronics technology,

(ii) facilitate the identification of organizational research objectives,

(iii) identify possible collaborative research opportunities ,

(iv) contribute to fostering good relationships and cooperation among the local scientific and technological community.



Current Year Activities

(1) Conducted *1st VI Workshop Series*:

- Provide VTC Personnel with Visibility Into Current Research Activities
- Establish Relationships with Academic Community

(2) Identified and Initiated *Collaborative Research Activities*

(i) Embedded Simulation

(ii) Fault Tolerance in Real-Time Networks

(iii) Intelligent Control Systems

(3) Drafted *Vetronics Research Plan*

- Identify Relevant Research Domains
- Define Annual Research Objectives

Summary of 1st VI Workshop Series

(i) Embedded Networks in Vehicle Systems: Presented an overview of networks in vehicles followed by a description of real-time issues and fault tolerance.

Presenter: *Dr. Paul Richardson, University of Michigan-Dearborn*

(ii) Reconfigurable Computing: Presented the foundations of reconfigurable computing and how to architect reconfigurable systems.

Presenter: *Dr. Ali Elkateeb, University of Michigan-Dearborn*

(iii) Simulations in Embedded Platforms: This workshop presented an overview of embedded simulations and described several significant obstacles.

Presenter: *Dr. Yi Lu Murphey, University of Michigan Dearborn*

(iv) Robust Controls In Robotic Systems: Describe issues related to the H-infinity formulation, control design with tight performance specifications and parameterization of control systems.
Presenters: *Dr. Ka C. Cheok, Oakland University and Dr. N. Narasimhamurthi, University of Michigan Dearborn*

Summary of Collaborative Research

(i) Issues for Real-Time Networks in Vehicle Systems

- Guarantee All Message Time Constraint at High Bandwidth Utilization
- Explore Methods To Reduce System Development and Maintenance Costs
- Develop Effective Means to Detect and Respond To Transient Network Faults

Collaborators: *Larry Sieh, Rakesh Patel, U.S. Army TARDEC*; *Paul Richardson, University of Michigan-Dearborn*

(ii) Intelligent Control Systems

- Investigate Intelligent Systems Techniques for Mobile Robots
- Explore Systems that Modify their Existing *I/O, Memory* and *Rules*
- Demonstrate the Features that Qualify a Robot as a Smart Machine.

Collaborators: *Bruce Brendle, U.S. Army TARDEC*; *Ka C Cheok, Oakland University*

(iii) Embedded Simulation

- Develop an Integrated Video and Terrain Database System.
- Locate Objects in Real-Time Video and Relate them to Virtual Objects in a Database.
- Register Real-Time Video with Terrain Database

Collaborators: *Paul Bounker, U.S. Army TARDEC*; *Yi Lu Murphey, University of Michigan-Dearborn*

Coming Soon

- **2002 *Call for Workshops***
- **2002 Presentation of Collaborative Research Results**
- **Final Vetronics Research Plan for 2001**
- **VI Website**

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